ABSTRACT OF THE INVENTION

An operator shielded X-ray imaging system has sufficiently low mass (less than 300 kg) and is compact enough to enable portability by reducing operator shielding requirements to a minimum shielded volume. The resultant shielded volume may require a relatively small mass of shielding in addition to the already integrally shielded X-ray source, intensifier, and detector. The system is suitable for portable imaging of well cores at remotely located well drilling sites. The system accommodates either small samples, or small cross-sectioned objects of unlimited length. By rotating samples relative to the imaging device, the information required for computer aided tomographic reconstruction may be obtained. By further translating the samples relative to the imaging system, fully three dimensional (3D) tomographic reconstructions may be obtained of samples having arbitrary length.